

REMARKS

Claims 1 through 11 and new Claims 19 and 20 are pending in the application.

Claim 1 has been amended to reflect that the flame retardant(s) advantageously consist essentially of one or more organic phosphorous compounds. Support for this amendment can be found in the application as filed, for example on Page 9, third full paragraph, first sentence.

Claim 7 has been cancelled, as its subject matter has been incorporated into Claim 1. Claims 8 and 9 have been amended to depend from Claim 1.

Claims 19 and 20 have been added to complete the record for examination and highlight advantageous embodiments of the invention.

Claim 19 is directed to advantageous biaxially oriented films incorporating a UV stabilizer selected from the group consisting of 2-hydroxybenzophenones, 2-hydroxybenzotriazoles and triazines and flame retardant consisting essentially of one or more organic phosphorous compounds. Support for Claim 19 can be found in the application as filed, for example on Page 9, third full paragraph, first sentence and Page 7, third full paragraph, last sentence.

Claim 20 is directed to beneficial embodiments in which at least the flame retardant masterbatch has been predried and/or precrystallized, and the film thus further includes predried and/or precrystallized first masterbatch carrier polymer. Support for Claim 20 can be found in the application as filed, for example on Page 10, third full paragraph in its entirety and Page 17, second full paragraph in its entirety.

Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

The Claimed Invention is Patentable
in Light of the Art of Record

Claims 1 through 2 and 4 through 8 stand rejected over German Patent Application DE 19630599 A1 to Murschall et al. (DE 599) in view of United States Patent No. 4,265,804 to Zannuci et al. (US 804) and United States Patent No. 5,936,048 to Oishi et al. (US 048). Claim 3 stand rejected over the foregoing references, and further in view of United States Patent No. 6,251,505 to Rakos et al. (US 505). Claims 9 and 10 stand rejected over the foregoing references as applied to claim 1 above, and further in view of United States Patent No. 5,866,246 to Schreck et al. (US 246) and United States Patent No. 5,008,313 to Kishida et al. (US 313). Claim 11 stands rejected under 35 U.S.C. 103(a) as being unpatentable over DE 599 in view of US 804, US 246, US 313, and United States Patent No. 4,551,485 to Ragan et al. (US 485).

Claims 1 through 6 stand rejected over United Kingdom Patent Application GB 2 344 496 A to Macdonald (GB 596) in view of DE 599. Claims 7 and 8 stand rejected over the immediately foregoing references, and further in view of US 048. Claims 9 and 10 stand rejected over GB 596 as modified by DE 599 as applied to claim 1 above, and further in view of US 246 and US 313. Claims 1, 7, 9 and 11 stand rejected over GB 596 in view of DE 599, US 246, US 313 and US 485.

Before addressing the merits of the rejection, Applicants respectfully submit that priority has been perfected herein and GB 596 has been removed as prior art against the above-referenced application. GB 596 has a publication date of June 14, 2000. The present application is entitled to a priority date of January 20, 2000. Applicants

submit herewith a certified English translation of German parent application 100 02 171.9, thereby perfecting the German priority date, as requested by the Examiner. Accordingly, Applicants respectfully note that GB 596 does not constitute prior art and that the rejection under 35 USC § 103 in light of GB 596 has thus been obviated.

It may be useful to consider the invention as recited in the claims before addressing the merits of the rejection. The claims are directed to transparent, low-flammability, UV-resistant, biaxially oriented film having a thickness of from 5 to 300 μm . The films include at least one crystallizable thermoplastic, at least one UV stabilizer, and at least one flame retardant that is not chemically bonded to the crystallizable thermoplastic. The flame retardant(s) consist essentially of one or more organic phosphorous compounds. The flame retardant and UV stabilizer are provided in the form of one or more compounded masterbatches.

In particularly advantageous embodiments, the films of the invention include at least one UV stabilizer selected from the group consisting of 2-hydroxybenzotriazoles and triazines, along with flame retardant consisting essentially of one or more organic phosphorous compounds, as recited in Claim 19.

Surprisingly, the claimed films exhibit a luminous transmittance of $>80\%$ when measured according to ASTM D 1003; a surface gloss of >100 when measured at an angle of 20° according to DIN 67530; a haze of $\leq 20\%$ when measured according to ASTM S 1003 and a yellowness index of ≤ 10 as measured in accordance with DIN 6167. Such advantageous optical properties are altogether unexpected in light of the presence of both UV stabilizer and flame retardant within the claimed films. In contrast to the opinion apparently urged within the Office Action, Applicants respectfully submit that under United States practice working examples, and for that matter comparative examples, are not required.

In addition to films providing the recited advantageous optical properties, Applicants have further determined the use of predried and/or precrystallized flame retardant masterbatches to be highly beneficial. Flame retardant polymeric articles have historically been difficult to manufacture, as alluded to in US 048 at Col. 4, lines 18 - 30. In particular, flame retardant polymers are known to cake in the dryer prior to extrusion, resulting in extensive downtime for the manufacturer. Quite unexpectedly, Applicants have found that the use of predried and/or precrystallized flame retardant masterbatches eliminates caking in the dryer and provides films that do not become brittle upon exposure to high temperatures and do not break when folded. (The Examiner's attention is kindly directed to the Application-as-filed on Page 10, third full paragraph in its entirety). Claim 20 is directed to such beneficial embodiments in which the flame retardant masterbatch has been predried and/or precrystallized, and the films thus further include predried and/or precrystallized first masterbatch carrier polymer.

The cited references do not teach or suggest the claimed invention, considered either alone or in combination.

Applicants respectfully reiterate that DE 599 is directed to polyethylene terephthalate cast sheet. DE 599 discloses the incorporation of UV stabilizer and one or more antioxidants into such cast sheet. The cast sheet ranges in thickness from about 0.8 to 20 mm. In contrast to the opinion urged within the Office Action, the film thickness of Examples 1 through 6 is 4 mm.

Applicants respectfully reiterate that DE 599 does not teach or suggest the claimed transparent, UV resistant, flame retardant films, and most certainly not the recited biaxially oriented, transparent, UV resistant flame retardant films ranging in thickness from 5 to 300 microns. DE 599 further does not teach or suggest UV resistant, flame retardant films incorporating the recited UV absorbers and flame

retardants of Claim 19. Nor does DE 599 teach or suggest the predrying and/or precrystallization of flame retardant masterbatches, as recited in Claim 20.

Applicants thus respectfully submit that the claimed invention is patentable in light of DE 599, considered either alone or in combination with the art of record.

US 804 is merely directed to resins incorporating particular multichromophoric ultraviolet stabilizers. (Col. 2, lines 9 – 13). US 804 incorporates the particular multichromophoric stabilizers in an attempt to address deficiencies noted within more conventional ultraviolet stabilizers. US 804 expressly notes that “it is known” that polyesters “do not respond well” when hydroxybenzophenones are used, for example. (Col. 2, lines 20 – 25). US 804 is quite generic in its description of suitable incorporation methods, noting for example that the multichromophoric stabilizers may be incorporated by merely adding the stabilizer to the surface of the molded object. (Col. 7, lines 52 – 57).

US 804 similarly does not teach or suggest the recited transparent, UV resistant, flame retardant films. US 804 further does not teach or suggest the recited transparent, UV resistant, flame retardant films incorporating the recited UV absorbers and flame retardants of Claim 19. In fact, US 804 teaches away from the recited 2-hydroxybenzophenones. Nor does US 804 teach or suggest masterbatches, much less the predried and/or precrystallized flame retardant masterbatches recited in Claim 20.

Applicants thus respectfully submit that the claimed invention is patentable in light of US 804, considered either alone or in combination with the art of record.

US 048 is generally directed to methods for bonding norbornenyl group-containing compounds to polymer resins. (Col. 4, lines 40 – 45; Col. 7, lines 60 – 66 and Col. 9, line 66 – Col. 10, line 3). US 048 provides a laundry list of suitable “resins,”

including waxes and oils. (Col. 17, line 24 – Col. 18, line 39). The norbornenyl group is said to impart a host of benefits to the resulting modified resin, including improved flame retardance and resin compatability. (Col. 9, lines 37 - 49). US 048 notes that the norbonenyl group modified resin is preferably used in conjunction with secondary flame retardants. (Col. 4, lines 60 – 65). US 048 expressly discourages phosphorous-containing compounds alone as flame retardants as their effect “is insufficient.” (Col. 3, lines 49 – 50). US 048 also discourages the use of triazine compounds, noting difficulties associated with sublimation, bleeding, manufacturing issues and the deterioration of physical properties. (Col. 3, line 62 – Col. 3, line 3) US 048 expressly notes that the resins may be used to form molded articles, such as injection molded articles, fibers, coatings and adhesives. (Col. 7, line 44 – 54).

US 048 thus does not teach or suggest the recited transparent, UV resistant, flame retardant biaxially oriented films. In fact, US 048 teaches away from the recited flame retardant(s) consisting essentially of one or more organic phosphorous compounds. US 048 also does not teach or suggest the recited transparent, UV resistant, flame retardant films incorporating the recited UV absorbers and flame retardants of Claim 19. In fact, US 048 teaches away from the 2-hydroxybenzotriazoles and triazines recited in Claim 19. And US 048 most certainly does not teach or suggest the predried and/or precrystallized flame retardant masterbatches recited in Claim 20.

Applicants respectfully submit that there would have been no motivation to have combined these references, which are in different fields of endeavor and address altogether different problems. DE 599 is directed to cast films having improved UV performance. US 804 is directed to particular multichromophoric stabilizers that are said to address deficiencies noted within more conventional stabilizers. US 048 is directed to methods for bonding norbornenyl group-containing compounds to polymer resins.

However, even if combined (which Applicants submit should not be done), the claimed invention would not have resulted. DE 599 requires cast sheet having a thickness between 5 to 300 microns. US 804 is directed to particular multichromophoric stabilizers. US 048 requires flame retardant in the form of a norbornenyl group-containing compound bonded to the polymer chain.

Consequently, even if combined, the recited transparent, UV-resistant, biaxially oriented film having a thickness of from 5 to 300 μm , in which the film includes at least one UV stabilizer and at least one flame retardant consisting essentially of one or more organic phosphorous compounds would not result. And the advantageous UV stabilizers of Claim 19 would most certainly not result. Similarly, the predried and/or precrystallized masterbatches of Claim 20 would not result.

Accordingly, Applicants respectfully submit that Claims 1, 2, 4 through 8, 19 and 20 are patentable in light of DE 599, US 804 and US 048, considered either alone or in combination.

Claim 3 is similarly patentable in light of the foregoing references and further in view in US 505.

US 505 is generally directed to the use of light diffusing filler within the outer layer of translucent co-extruded films intended for backlit displays. (Col. 2, line 66 – Col. 3, line 6). In contrast to the recited transparent films, US 505 requires translucent films so that the back of the frame and the light source is not visible through unprinted areas. (Col. 1, lines 23 – 25, (noting that it is important that the films be ‘translucent rather than transparent’)). US 505 notes light transmissions of 30% as acceptable. (Col. 3, lines 41 – 42). The working examples indicate light transmissions ranging from 50 to 70%. (Col. 7, line 65 – Col. 9, line 55). US 505 further expressly notes that although the films may not be opaque, any light traveling through the film thickness

must be highly diffused, i.e. the films of US 505 are required to have a sufficiently elevated level of haze. (Col. 1, lines 45 – 50).

US 505 does not teach or suggest the recited transparent, UV-resistant, flame retardant films, and most certainly not such transparent films exhibiting the recited luminous transmittance of $>80\%$; a surface gloss of >100 and a haze of $\leq 20\%$. In fact, US 505 teaches away from transparent, high gloss, low haze films by requiring translucent films that diffuse light.

Applicants respectfully reiterate that there similarly would have been no motivation to have combined these references, which are in different fields of endeavor and address altogether different problems. DE 599 is directed to cast films having improved UV performance. US 804 is directed to particular multichromophoric stabilizers. US 048 is directed to methods for bonding norbornenyl group-containing compounds to polymer resins. US 505 is directed to the use of light diffusing filler to form translucent films.

However, even if combined (which Applicants submit should not be done), the claimed invention would not have resulted. DE 599 requires cast sheet having a thickness between 5 to 300 microns. US 804 is merely directed to particular multichromophoric stabilizers. US 048 requires a norbornenyl group-containing compound that is bonded to the polymer chain. US 505 requires translucent films.

Consequently, even if combined, the recited transparent, UV-resistant, biaxially oriented film having a thickness of from 5 to 300 μm , in which the film includes at least one UV stabilizer and at least one flame retardant consisting essentially of one or more organic phosphorous compounds would not result, and most certainly not such films exhibiting the recited luminous transmittance of $>80\%$; a surface gloss of >100 and a haze of $\leq 20\%$.

Accordingly, Applicants respectfully submit that Claim 3 is patentable in light of US 505, considered either alone or in combination with the art.

Claims 9 and 10 are similarly patentable in light of foregoing primary and secondary references and further in view of US 246 and US 313.

US 246 is also directed to non-transparent filled films, particularly opaque filled films. (Col. 2, lines 25 – 26; Col. 15, line 44 – Col. 16, line 50 and see Col. 1, lines 15 – 18 (noting that films can roughly be divided into two classes, i.e transparent films and non-transparent films)). The films of US 246 address the chalking found in conventional non-transparent films by incorporating incompatible polymeric particulate hollow bodies to form vacuoles in lieu of conventional fillers. (Col. 2, lines 43 – 50 and Col. 1, lines 8 - 10). US 246 notes that the films refract light, i.e produce haze, due to microcavities present between the film matrix and the incompatible polymeric particulate. (Col. 4, lines 39 – 42).

US 246 does not teach or suggest the recited transparent films of the invention, and most certainly not the transparent, biaxially oriented films of the claimed invention exhibiting the recited luminous transmittance of >80% and a haze of ≤20%.

US 313 is generally directed to resins incorporating butadiene polymer as an impact modifier. (Col. 2, lines 29 – 36). In addition to butadiene polymer, the impact modifier further contains a particular stabilizer mixture. (Col. 2, lines 40 – 51). US 313 is generally silent as to the ultimate form the resins take. However, the background of US 313 is directed to molded parts, such as produced by injection molding, and injection-molded articles are produced within the examples. (Col. 1, lines 18 – 23; Col. 6, lines 60 – 62; Col. 7, lines 64 – 65; Col. 8, lines 63 – 65, lines 32 – 35; and Col. 11, lines 10 – 11).

US 313 does not teach or suggest the recited transparent films of the invention, and most certainly not the transparent, biaxially oriented films of the claimed invention. exhibiting the recited luminous transmittance of $>80\%$ and a haze of $\leq 20\%$.

Applicants again respectfully reiterate that there similarly would have been no motivation to have combined these references, which are in different fields of endeavor and address altogether different problems. DE 599 is directed to cast films having improved UV performance. US 804 is directed to particular multichromophoric stabilizers. US 048 is directed to methods for bonding norbornenyl group-containing compounds to polymer resins. US 246 is directed to incompatible polymeric particulates within non-transparent films to address chalking. US 313 is directed to butadiene polymers as impact modifiers.

However, even if combined (which Applicants submit should not be done), the claimed invention would not have resulted. DE 599 requires cast sheet having a thickness between 5 to 300 microns. US 804 is merely directed to particular multichromophoric stabilizers. US 048 requires a norbornenyl group-containing compound that is bonded to the polymer chain. US 246 is directed to non-transparent films. US 313 is directed to molded parts.

Consequently, even if combined, the recited transparent, UV-resistant, biaxially oriented film having a thickness of from 5 to 300 μm , in which the film includes at least one UV stabilizer and at least one flame retardant consisting essentially of one or more organic phosphorous compounds would not result, and most certainly not such films exhibiting the recited luminous transmittance of $>80\%$; a surface gloss of >100 and a haze of $\leq 20\%$.

Applicants thus respectfully submit that Claims 9 and 10 are patentable in light of US 246 and US 313, considered either alone or in combination with the remaining art of record.

Claim 11 is likewise patentable in light of the combination of foregoing references and further in view of US 485.

US 485 is directed to reinforced molding compositions that incorporate silane to improve the impact resistance of the resulting molded article. (Col. 1, lines 45 – 51). US 485 is more specifically directed to impact modified reinforced resins which are injection moldable at a relatively low mold temperature. (Col. 1, lines 7 – 10). Suitable reinforcing fillers for use in US 485 include fibers, whiskers and the like. (Col. 6, lines 57 – 58).

US 485, directed to reinforced molding compositions, does not teach or suggest the recited transparent films of the invention, and most certainly not the transparent, biaxially oriented films of the claimed invention exhibiting the recited luminous transmittance of $>80\%$ and haze of $\leq 20\%$.

Applicants again respectfully submit that there similarly would have been no motivation to have combined these references, which are in different fields of endeavor and address altogether different problems. DE 599 is directed to cast films having improved UV performance. US 804 is directed to particular multichromophoric stabilizers. US 246 is directed to incompatible polymeric particulates within non-transparent films to address chalking. US 313 is directed to butadiene polymers as impact modifiers. US 485 is directed to silane within injection molded articles to improve impact strength.

However, even if combined (which Applicants submit should not be done), the claimed invention would not have resulted. DE 599 requires cast sheet having a thickness between 5 to 300 microns. US 804 is merely directed to particular multichromophoric stabilizers. US 246 is directed to non-transparent films. US 313 and US 485 are directed to molded parts.

Consequently, even if combined, the recited transparent, UV-resistant, biaxially oriented film having a thickness of from 5 to 300 μm , in which the film includes at least one UV stabilizer and at least one flame retardant consisting essentially of one or more organic phosphorous compounds would not result, and most certainly not such films exhibiting the recited luminous transmittance of $>80\%$; a surface gloss of >100 and a haze of $\leq 20\%$.

Accordingly, Applicants respectfully submit that Claim 11 is patentable in light of US 485, considered either alone or in combination with DE 599, US 804, US 246, and US 313.

Based on the foregoing, Applicants respectfully submit that the claimed invention is patentable in light of the cited art, considered either alone or in combination.

Conclusion

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1 through 11, 19 and 20 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional fees are necessary to allow consideration of this paper, the fees are hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,

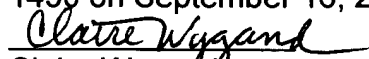


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